WATERFOWL MANAGEMENT PLAN

Newfoundland and Labrador

Environment Canada
Canadian Wildlife Service

Environnement Canada
Service canadien de la faune

Newfoundland and Labrador
Culture, Recreation and Youth
Wildlife Division

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Ministère de l'Environnement
de Terre-Neuve et du Labrador
Division de la faune

In 1986, the North American Waterfowl Management Plan was signed by the Minister of the Environment for Canada and the Secretary of the Interior for the United States.

The plan sets out several guiding principles to ensure conservation of our waterfowl populations. Key among these is the central theme that protection of waterfowl and its habitat requires long term planning and close coordination of management activities between various jurisdictions. Accordingly, the Canadian Wildlife Service and the Newfoundland Wildlife Division have cooperated to produce this provincial waterfowl management plan.

for Jim Hancock

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Introduction

Waterfowl are an important natural resource for residents of Newfoundland and Labrador - as they are for all North Americans. They represent the most important game-bird group and are a highly visible element on the provincial scene. Waterfowl generally nest and raise their young in northern areas, migrating to more favourable southern areas to spend the winter. Each of the 24 species of ducks and geese that regularly occurs in Newfoundland and Labrador is unique in its biology, distribution and movements. They represent an important natural resource which should be conserved and enhanced through sound management, affording both protection and use.

In Newfoundland and Labrador, murres (or turrs) and other seabirds were traditionally hunted for food. An exception to the Migratory Birds Convention permitted Newfoundlanders to harvest murres, and greater numbers of murres are taken annually in recent years than waterfowl. Wildlife management agencies have become concerned that harvest of turrs is too great to be supported by existing populations, and a strategy for controlling the turr harvest is being developed. The management of seabirds poses quite different problems than the management of waterfowl, and seabirds are treated in a separate document; their management is not included in this plan.

Waterfowl provide direct social and economic benefits in Newfoundland and Labrador. Migratory Game Bird Hunting Permit sales have varied between 37,000 and 25,000 over the last decade, with the number of hunters purchasing permits generally decreasing over this period. A survey on the Value of Wildlife to Canadians (Federal-Provincial Task Force for the 1987 National Survey on the Importance of Wildlife to Canadians, 1989) indicated that direct expenditures in Newfoundland and Labrador related to waterfowl hunting amounted to approximately $12.5 million in 1987. Total expenditures on hunting amounted to $42 million. Non-hunting activities related to wildlife, such as bird-watching and animal photography, contributed another $22 million to the economy of Newfoundland and Labrador.

Waterfowl populations are managed within the framework of the Convention for the Protection of Migratory Birds, which was signed for Canada and the United States in 1916 and which came into effect in Newfoundland following Confederation in 1949. This Convention recognizes that migratory birds, and particularly waterfowl, can only be conserved and managed by the co-operative efforts of all provincial, state, and federal governments through whose jurisdictions they move. The Convention focussed on harvest regulation because over-hunting was a principal concern in the early 1900s. The Great Auk and the Labrador Duck had been hunted to extinction, and several other species, including the southern race of the Common Eider, reached perilously low numbers. Since that time, the "indiscriminate slaughter" referred to in the Convention has been largely brought under control. Over-harvest is infrequently implicated when a species is found to be in difficulty, although hunting and egging appear still to be controlling factors for some waterfowl populations important to the residents of Newfoundland and

Labrador.

Despite the successes in waterfowl conservation achieved under the Convention, concern still exists regarding some species. Harvest is still an important factor in the management of some waterfowl populations in Newfoundland and Labrador, notably the Common Eider and the Harlequin Duck. The recent focus in continental waterfowl management has shifted to the quantity and quality of habitat available to the birds through their life cycles. The problem with decreasing habitat is most dramatic in Prairie Canada, but it is a potential factor in Newfoundland and Labrador and it must be considered in any modern management strategy.

Waterfowl management now demands the cooperative efforts of all those interested in the conservation of waterfowl: governments, conservation organizations, industry and private citizens. It also demands time, ingenuity, and dollars. In 1986, Canada and the United States signed the first North American Waterfowl Management Plan (NAWMP). The plan sets the framework for continental waterfowl management for the next 15 years. Populations requiring priority attention are identified, and include the Black Duck in eastern North America. Specific remedies are proposed, and new mechanisms are identified to improve on existing ones. For much of North America, and for most species, habitat conservation is identified as the top priority. For some species improved harvest management is indicated; and in other cases there is little that waterfowl managers can do to influence the situation. Specific investigations may be called for where waterfowl managers don't understand what is governing population levels.

The Newfoundland and Labrador Waterfowl Management Plan builds on the broader framework of the North American WMP and provincial wildlife conservation documents, including the recent Habitat Protection Plan for Migratory Birds. Newfoundland and Labrador's management actions must be integrated with those of other eastern provinces and states comprising the Atlantic Flyway (Figure 1). The Newfoundland and Labrador WMP provides information on the waterfowl resource and its use on this broader scene, to facilitate co-operative management.

The purpose of this document is to describe the existing situation with respect to waterfowl and their habitats, to establish goals and objectives, and to describe general policies, programs and strategies to achieve these objectives. The list of species requiring priority attention is expanded beyond those of "immediate international concern" and includes species of interest in Newfoundland and Labrador such as the Canada Goose, Common Eider and Harlequin Duck. This document uses the same time frame of 15 years as does the North American WMP. The Newfoundland and Labrador Waterfowl Management Plan is a public document and will act as a guide and reference for all who have an interest in the conservation of the natural resources of the province.

Supplementary documents will be developed by the government and non-government agencies contributing to the implementation of the WMP. Those documents will specify activities which will be undertaken by the parties actively participating in the conservation and management of waterfowl and their habitats. They will be reviewed each year and updated as required.

Figure 1. The Atlantic Flyway, with the position of Newfoundland and Labrador within the system.

Goals and Objectives

The goals of the Newfoundland and Labrador WMP are in agreement with other provincial conservation documents. They are:

→ to maintain the current diversity of native waterfowl species in their natural habitats;

→ to provide waterfowl use and enjoyment opportunities in a variety of forms for the benefit of residents of Newfoundland and Labrador and their visitors;

→ to manage waterfowl populations at levels which

- ensure their perpetuation, and are consistent with international goals,
- provide acceptable levels of benefits, and
- are compatible with other resource uses and community interests.

→ to maintain the quality of wetland sites in Newfoundland and Labrador critical to all phases of waterfowl life (along with efforts under the Habitat Protection Plan).

For most species the objective is to maintain populations at, or somewhat above, current levels.

The primary objective for the Common Eider (southern race) is to re-establish nesting at several suitable locations around the island, allowing the population to double in the next 10 years; the long-term population objective is to ensure at least 20,000 breeding pairs on the island. Many more eiders breed in Labrador, but egging and illegal hunting are holding numbers below carrying capacity there, so these practices will have to be restricted.

The objective for the Harlequin Duck is to increase populations in eastern North America to self-sustaining levels. Current population estimates will have to be improved before more specific numerical objectives can be established for these birds.

For Black Ducks, an increase of 30 per cent in the continental population is called for in the North American WMP. For this objective to be met, enhancement of Black Duck numbers in Newfoundland and Labrador must be a priority, and this is reflected throughout this plan.

Duck and goose populations

Government agencies have monitored provincial waterfowl populations occasionally since the 1950s, and general patterns of occurrence and relative numbers are emerging. Systematic and continuing data sets are lacking, and trends and absolute abundance can not be estimated precisely. A waterfowl population budget (Erskine 1987), using a variety of data sources and inferences, provided estimates which indicate the order of magnitude of the populations,, and thus allow comparisons of the Newfoundland and Labrador situation to those in other areas.

Estimated spring (breeding plus non-breeding) populations of waterfowl in Newfoundland and Labrador, by species (from Erskine 1987), are compared to those in other Atlantic Provinces, and to the Atlantic Flyway as a whole, in Table 1. Flyway totals are adapted from U.S. Fish and Wildlife Service Mid-winter Inventory data. The most abundant species of breeding waterfowl in Newfoundland and Labrador are Canada Geese (110,000 birds), Red-breasted Mergansers (80,000 birds), Black Ducks (70,000 birds), Green-winged Teals (60,000 birds), and Common Eiders (55,000 birds). Spring populations of other species number under 30,000 birds. Labrador harbours larger numbers of most species than the island of Newfoundland.

Breeding populations tell only part of the story. Each spring and fall, local numbers swell as birds migrating to and from their nesting grounds stop-over. A few areas along the east and south shores of Newfoundland and Labrador harbour wintering populations of inland ducks and geese, and sea ducks are present year-round. It is from the fall and winter populations of waterfowl that the harvest should be taken, as the spring birds provide the breeding stock for future years.

The groupings of ducks used in the North American WMP required modification in Newfoundland and Labrador, where the coastal habitats frequented by diving ducks are more important than in other regions. A more useful segregation here is as "inland ducks" (dabbling ducks, plus Ring-necked Duck, scaups, Common Goldeneye, and Common Merganser), and "sea ducks" (eiders, scoters, Oldsquaw, Harlequin Duck, Red-breasted Merganser).

INLAND DUCKS

The inland ducks are the most widespread group in Newfoundland and Labrador and the most important ducks to inland sport hunters. The Black Duck, Green-winged Teal, and Common Goldeneye are the major species, comprising nearly 75% of all breeding inland ducks in the province. Ring-necked Ducks are also abundant on the island, and scaups in Labrador. Some formerly "western" species are making a minor and recent incursion in the province, following their appearance and establishment in the Maritimes. These include Mallard, Pintail and American Wigeon.

Systematic attempts to quantify waterfowl population trends began only in the 1940s, when visits by USFWS biologists led to the first

Table 1. Estimated spring populations (individuals, including breeders and non-breeders) of waterfowl in Atlantic Provinces (adapted from Erskine, 1987), with comparisons to Atlantic Flyway (adjusted from Midwinter Waterfowl Inventory, mean of 1975-84).

Species	Spring Populations (individuals) Nfld.	Labr.	N.B.	N.S	P.E.I.	Nfld/Labr. as % of AR	Nfld./Labr.as % of AF MWI* 75-84
Wood Duck	-	-	4200	300	100	0	0
Green-winged Teal	16500	45900	10400	7600	1100	76.6	12.3
Black Duck	37000	32800	49300	31900	4700	44.8	6.4
Mallard (excluding feral)	100	600	1100	300	200	30.4	0.1
Pintail	1100	2500	1100	600	700	60.0	1.3
Blue-winged Teal	300	-	12300	10100	5600	1.1	0.1
American Wigeon	800	-	1100	600	1100	22.2	0.3
Ring-necked Duck	15700	1400	15400	11500	4800	35.0	4.2
Greater & Lesser Scaups	100	26900	tr	-	tr	100-	5.5
Common & Barrow's Goldeneyes	15100	14700	10200	700	tr	73.2	46.8x
Common & Hooded Mergansers	6000	7000	1000	700	-	88.4	20.2
Red-breasted Merganser	10900	56000	800	600	400	97.4	51.9
Common & King Eiders	1200	55000	28000	32000	-	48.4	48.2x
Harlequin Duck	70	1800	-	-	-	100	90
Oldsquaw	-	1100	-	-	-	100	6.5
Surf & Black Scoters	-	24900	-	-	-	100	12.1
Canada Goose	18400	90400	100	300	300	99.4	12.0

* MWI adjusted for visibility thus: Wood Duck, Green-winged Teal, x 10 (in woods & shrubbery)
other dabblers, Ring-necked Duck, x 4 (in marshes)
divers and geese, x 1 (open water)
scoters & mergansers, x 3 (out to sea)
MWI adjusted for species wintering S of U.S.A., thus: Green-winged Teal, x 1.2;
Blue-winged Teal, x 5; Shoveler, x 1.2;
American Wigeon, x 1.2; Ring-necked Duck, x 2.5.
Mergansers were not segregated to species in MWI - here arbitrarily split 33% Common & Hooded, 67% Red-breasted.
(## wintering within AR deducted from total before calculation for Black Duck, all divers, Canada Goose.)

x estimate certainly too high (i.e. adjustments insufficeient to remedy incomplete coverage of MWI).

Not listed in Table 1, but included in totals in text, are: (i) regular migrants or winterers - White-winged Scoter, Bufflehead, Brant; (iii) vagrants - Eurasian Wigeon, Ruddy Duck.

Table 2. Waterfowl population trends and goals for major species in Newfoundland and Labrador.

Major Species (-groups)	Nfld./Labr. Trend in Breeding Numbers	Nfld./Labr. Goals (year 2000)
Green-winged Teal	kill/effort declining	halt decline*
Black Duck	kill/effort stable	increase numbers (as in NAWMP)*
Mallard	scarce, increasing	maintain numbers*
Pintail	none evident	maintain numbers
Blue-winged Teal	scarce, stable	maintain numbers
American Wigeon	scarce. increasing	allow increase
Ring-necked Duck	kill/effort increasing	maintain numbers
Scaups	none evident	maintain numbers
Common Goldeneye	kill/effort stable	maintain numbers
Mergansers	none evident	maintain numbers
Common Eider	kill/effort declining	increase numbers*
Harlequin Duck	apparently declining	increase numbers*
Oldsquaw	none evident	maintain numbers
Scoters	none evident	maintain numbers
Canada Goose	stable or increasing	allow increase

* As discussed in text.

book on the birds of Newfoundland (Peters and Burleigh 1951). The Ring-necked Duck was first detected in the province in 1942, and it has since increased to a major species on the island. There is little other evidence of trends in this group, although - as elsewhere - the overall decrease in Black Ducks and the decline in harvest per hunter-day of Green-winged Teals may be cause for concern. Generalized population trends of waterfowl in the Atlantic Region are shown in Table 2, with the general objectives for each species.

According to the USFWS Mid-Winter Inventory, the Black Duck has suffered a serious decline over the past 30 years. On the breeding grounds also, a decline has been evident in southern Ontario and south-western Quebec where Mallards have largely replaced Black Ducks. In Newfoundland and Labrador, as elsewhere in the Atlantic Region, the Mallard is still very infrequent relative to the Black Duck, but its numbers are increasing gradually, especially near urban centres. The welfare of the Black Duck, as a recognizable entity, demands adoption of a policy that semi-wild Mallards should be confined, to the degree possible, to avoid inter-breeding and excessive competition for habitats with Black Ducks. The relative abundance of Blacks and Mallards will continue to be actively monitored.

The North American WMP objective of 385,000 Black Ducks, as measured by the Mid-winter Waterfowl Inventory, can only be reached if nesting populations and/or recruitment increase in Canada, where over 90% of the species' numbers breed. The Black Duck Joint Venture on surveys and research, co-sponsored by the CWS and the USFWS, was developed to help devise a strategy to address the continental objective in this area. By 1990, a specific population objective for breeding Black Ducks will be established for Newfoundland and Labrador.

The North American WMP identifies the requirement to establish independent means of verifying population trends. In 1983-89, breeding pair surveys for Black Ducks were undertaken throughout eastern Canada, as set out in the Black Duck Joint Venture. In Newfoundland, breeding pair surveys will be undertaken in high-density areas, mainly in the Central Forest Ecoregion, to monitor trends in Black Duck abundance as part of the continental effort. These surveys were begun in 1987. Surveys in Labrador are much more expensive, and a different monitoring strategy has been adopted. Surveys were undertaken in 1970 and 1980. In 1990, new surveys will be implemented, to monitor general abundance and distribution of all species. The methodology of those surveys is currently under review.

In developing a harvest strategy for Black Ducks, waterfowl managers have to assess the population status and harvest levels, and make judgements as to the impact of hunting relative to other factors in regulating the population. Surveys of hunter activity and success will be maintained, and upgraded where necessary, to obtain reliable estimates of harvest levels of all species of waterfowl. Harvest surveys also provide a second index to abundance as they provide a measure of take per unit effort.

For many years, wildlife agencies have been banding Black Ducks and other species in attempts

to answer several management questions. The data from these banding efforts have proved particularly useful in describing harvest patterns and dispersal of birds. Banding data have fallen short of expectations in efforts to measure survival rates, and they have not clarified the relative importance of hunting and non-hunting mortality. Banding will continue in Newfoundland and Labrador to help ascertain distribution and movement of birds. Banding and recovery data will be examined specifically to confirm dispersal patterns and estimate mortality rates.

The causes of the decline of Black Ducks through much of their range are not clear. Research will attempt to ascertain the relative importance of factors implicated in the decline, such as interaction with Mallards, habitat alteration, acid rain and hunting mortality. A carefully co-ordinated research program is an important element of the Black Duck Joint Venture, and some of that research may be undertaken in Newfoundland and Labrador, the area least influenced by Mallards to date.

In 1983, in response to concern that over-hunting may be contributing to the Black Duck's problem, restrictive regulations were put in place in the United States for 5 years with the intent of reducing harvest pressure. Restrictions on Black Duck harvest in Canada followed in 1984. Only slight restrictions were imposed in Atlantic Canada, where the evidence of a decline in Black Ducks was then weak. In 1987, season dates were adjusted in several zones in Newfoundland and Labrador, partially in response to concerns over local Black Duck populations. In 1988-89, wildlife management agencies of Canada and the United States re-evaluated the status of the Black Duck and the effect of the harvest restrictions which have been in place since 1983-84. A new 5-year harvest management strategy for Black Ducks in Newfoundland and Labrador was implemented, beginning in 1989, in concert with other jurisdictions. There are no plans to reduce farther the total legal harvest in Newfoundland and Labrador during this 5-year cycle; however, some adjustments to regulations may be indicated by the results of the Hunter Opinion Survey (see Use and Value). The harvest strategy will take into account the status of the population, within the province and elsewhere, and the need for fair access to the resource by hunters here and through the Flyway.

Green-winged Teals are numerous in the province. Hunter surveys show declines in harvest, both absolutely and on a take/unit effort basis, of Green-wings over the recent past which suggests that there may be a decline in this species' numbers. Regrettably, there is no cost-effective way to get an independent estimate of this trend for Green-wings. Continental estimates of abundance (based on surveys in the west) show no overall declines. The population status of Atlantic Canada Green-winged Teals - and other dabbling ducks - will be monitored, and if current indications of a downward trend in Green-wings continue special surveys and research projects will be implemented to validate the trends and assess causative factors.

In Newfoundland and Labrador, there is no evidence of meaningful trends in numbers of the diving ducks here grouped with "inland ducks": the scaups, Common

Goldeneye, and Common Merganser. The Bufflehead and Hooded Merganser occur only in small numbers during the migrations. The status, reproductive success, and harvest of these ducks will be monitored as described for dabbling ducks. Special surveys and research projects will be implemented as required, on a priority basis.

SEA DUCKS

The Common Eider is by far the most important sea duck in Newfoundland and Labrador. Red-breasted Mergansers and scoters also breed commonly in Labrador. Oldsquaws and King Eiders from the arctic winter around the coasts of the province. Other species occur in smaller numbers.

The southern race of Common Eider (S.m.dresseri) nests on a few coastal islands around the shores of Newfoundland, and it is relatively common as a nesting bird in central Labrador. The northern race (S.m.borealis) breeds from central Labrador north to the Arctic. Both forms winter commonly around the island of Newfoundland. Eider down is valuable commercially, and "cottage industries" exist on a small scale in eastern Quebec.

Numbers of Common Eiders breeding in more southern areas of Atlantic Canada have rebounded since implementation of the MBC imposed more rigorous hunting controls. In Newfoundland and Labrador, the largely anecdotal evidence points to a marked decline in their numbers since Confederation. Eiders probably are the marine bird most sought-after by hunters in the province (although more murres are taken). A combination of egging and spring hunting is believed to have decimated the eider breeding colonies around the island of Newfoundland and in Labrador south of Latitude 53 N; exploitation was underway before 1800, and has continued to the present. Public recognition of a decline in local stocks has been slow to develop, owing to the continued abundance of wintering northern eiders, but even the latter are now declining. Eider management and population recovery are complex and important, so the various elements must be drawn together into a coherent strategy. An Eider Recovery Plan for Newfoundland and Labrador has been developed to guide this process.

Efforts to protect breeding colonies of eiders, under the Habitat Protection Plan, and to monitor numbers both of breeding and wintering birds, will be continued and expanded as resources allow. As a priority, Migratory Bird Sanctuaries are being established at key nesting sites, starting in the Grey Islands in 1988. There are some fears that the large gulls, which may be expanding in numbers, are reducing reproductive success of the eiders. Large gulls are efficient predators of newly hatched eider ducklings. The reproductive success of Newfoundland eiders and the impact of gull predation on them will be assessed. Local corrective measures, as provided for in the Atlantic Region Gull Management Plan (1988), may be required.

The northern race of Common Eider nests in Labrador and in northern Quebec and the Northwest Territories. There is concern that harvest of these birds, which are taken in the north as well as in winter, may be leading to decreases in their abundance, as harvest per unit effort in Newfoundland declined

significantly from 1972 to 1982. Anecdotal evidence of winter distribution around Newfoundland also points to a decline. Monitoring of numbers of this population is extremely difficult in winter, but colonies can be censused during the nesting season. A monitoring program will be developed as a joint initiative involving federal, provincial and territorial agencies, to determine trends in abundance and nesting distribution of northern eiders. Improved data on population trends and harvest statistics may necessitate adjustment of hunting regulations to reduce harvest and maintain these populations.

Although eiders are recognized as the most frequently harvested sea duck, the relative importance of these birds is underestimated by existing harvest surveys based on hunter questionnaires and collections of wings. Experimental harvest surveys, using different methods or different time-frames than the regular National Harvest Survey, point to much greater harvest of eiders - and consequently lower levels of other species - than previously indicated. Efforts to improve surveys of sea duck harvest in Newfoundland and Labrador will be continued so as to provide a needed basis for population management of waterfowl.

The Harlequin Duck is rare in Newfoundland and Labrador. It is found in winter only around a few remote offshore islands and headlands, and it breeds along rapid rivers mainly in northern Labrador. The species was formerly more common in the province, but it has decreased noticeably since Confederation. Hunting pressure seems to be implicated in its decline, as the bird is very tame. A conservative harvest strategy is indicated here, as elsewhere, given the scarcity of the birds. In Newfoundland and Labrador, hunting for Harlequin Ducks will not be permitted until numbers increase significantly. A status report has been prepared on the eastern Harlequin Duck. Little scientific information is available on the biology of this population. Because the species is rare and favours remote locations, especially during the nesting season, research will be expensive and difficult. Studies will be undertaken to provide better estimates of the size and distribution of the breeding and winter populations. The status and harvest of other sea ducks will continue to be monitored by standardized surveys, as described for inland ducks.

GEESE

Canada Geese breed commonly in Newfoundland and Labrador, and also in northern Quebec. These stocks winter south to North Carolina and form part of the large, poorly differentiated group known as the Atlantic population. Overall numbers in this population have increased over the last several decades. There have been no systematic counts to indicate trends in the stocks breeding in Newfoundland and Labrador, which presumably have increased too, although harvest per unit-effort shows no trend. The geese from the Newfoundland (island) stock are thought to winter farther north than the Labrador birds, perhaps making up the flocks wintering in Nova Scotia and New England, but this has not been proved. Surveys to monitor breeding populations of Canada Geese in Newfoundland and Labrador will be undertaken as resources permit. In

conjunction with these surveys, banding and research projects will attempt to assess migratory routes and turnover rates. No other goose species regularly visit Newfoundland and Labrador. The Atlantic Brant and the Greater Snow Goose are occasional vagrants to the province, as are stray individuals of other geese from Eurasia.

Use and Value of Waterfowl

The real value of waterfowl to the people of Newfoundland and Labrador is not directly measurable. Newfoundland and Labrador would be a less attractive province if its waterfowl or other wildlife resources were depleted. The value of a resource is partly intrinsic, and partly related to use. The Migratory Birds Convention explicitly recognized the need to conserve species of birds that are useful, including waterfowl.

Under wise use and management, regulated hunting of waterfowl can continue without risk to future populations. Governments will attempt to provide maximum opportunities to waterfowl hunters in Newfoundland and Labrador consistent with the concepts of sustainable use and international resource-sharing.

The Migratory Birds Convention allows no open season for any waterfowl - excepting scoters by native people - in North America between March 10 and September 1. This limitation precludes access to most waterfowl during spring migration, a time when there has been a traditional use by inhabitants of Labrador. In 1979, Canada and the United States signed a Protocol to amend the Convention so as to provide greater flexibility in setting harvest regulations for northern native subsistence users. For a variety of reasons, this Protocol has yet to be ratified and put into effect. Canada will continue to explore means of permitting a legal, regulated, spring/summer harvest by traditional subsistence users in the north. including northern Labrador.

Estimates of the retrieved harvest of waterfowl are summarized in Table 3. The figures for Newfoundland and Labrador are compared with those for the other Atlantic Provinces, and for the Atlantic Flyway, to show the relative impact of the hunting effort in the province. Although the kill per hunter in Newfoundland and Labrador is greater than in the eastern states, the kill here of most species makes up a rather small proportion of the total Flyway harvest (from various stocks). Over the last decade the province's hunters may have taken about 4-5% of the total Black Duck and Green-winged Teal harvest, 13% of the Goldeneyes, and major proportions (27% for scoters, up to 67% for eiders) of the sea ducks. The varying proportions reflect in part the more northerly wintering distributions of the diving ducks.

Regulation of harvest is one of the main tools of waterfowl managers. Regulations are based on the level of harvest which is believed to be sustainable. In estimating total take from a population, waterfowl managers adjust the legal reported harvest to

Table 3. Waterfowl harvest (mean of 1973-83, adapted from Erskine 1987), for Newfoundland & Labrador, with comparisons to Atlantic Provinces and Atlantic Flyway totals.

Species	Retrieved kill by province (rounded off to 100s) Nfld.	Labr.	N.S.	P.E.I	N.B.	Nfld/Labr. as % of AR total	Nfld/Labr.as % of Flyway total
Wood Duck	100	30	500	20	2100	4.7	0.02
Green-winged Teal	8600	1600	12500	6700	9700	26.1	4.8
Black Duck	15000	4000	59100	17900	25000	15.7	4.0
Mallard	300	100	1800	600	1500	9.3	0.1
Pintail	400	400	900	800	1100	22.2	1.3
Blue-winged Teal	500	50	1600	1100	5000	6.7	0.5
American Wigeon	100	40	400	300	1600	5.7	0.2
Ring-necked Duck	3900	300	2900	500	3800	36.8	2.9
Greater & Lesser Scaups	300	1300	700	60	700	52.3	2.1
Common & Barrow's Goldeneyes	6100	3400	5300	300	4900	47.5	13.0
Bufflehead	10	200	2500	80	600	6.2	0.3
Hooded & Common Mergansers	2600	800	2500	100	1400	45.9	5.8
Red-breasted Merganser	1900	1300	2500	700	800	44.0	18.1
Common & King Eiders	63800x	10700x	9400	50	600	88.1	66.8
Harlequin Duck	100	100	50	0	0	80+	80+
Oldsquaw	10200x	1500x	3100	500	400	74.5	31.3
Black, Surf, and White-winged Scoters	22000x	6600x	9300	260	900	73.2	26.9
Canada Goose	7200	3500	8400	13300	3800	29.6	2.3

* (U.S.-Atl.Fl.) & AR + Quebec (not Ontario), mean of 1977-84 kill, not adjusted for crippling loss.

x The harvest of sea ducks in Nfld. & Labr. here covers only the period through early January, as in the other provinces; the total kill, particularly of eiders, is substantially larger, as the hunting season there extends until 10 March. The species composition shown differs greatly from general impressions, with too many scoters relative to eiders and Oldsquaws; there is no objective way of adjusting these figures at present.

allow for crippling loss and poaching. In Newfoundland and Labrador, as in most areas, estimates of crippling loss and illegal harvest are based on a weak data set, yet these factors may have an important influence on the population balance. Efforts will be continued to improve estimates of illegal harvest and crippling loss so as to appreciate the full impact of hunting on waterfowl populations.

Because waterfowl are migratory, harvest regulations in Newfoundland and Labrador must be co-ordinated with those in other jurisdictions. They must attempt to restrict illegal activity while not unnecessarily impeding legal users. Regulations obviously also constrain hunter activity, and must therefore be tailored to hunter needs and attitudes as much as possible. For this reason government agencies periodically conduct hunter preference surveys to provide information for regulation setting. Hunter preference surveys will be conducted periodically in Newfoundland and Labrador, beginning in 1988-89, to assess hunter perspectives related to harvest regulations. In addition, management agencies will continue to consider regulatory proposals forwarded by hunter and conservation groups.

Enforcement of hunting regulations is an essential element of waterfowl management and requires the co-ordinated actions of many agencies. The Canadian Wildlife Service is responsible for the co-ordination of enforcement activities, but the principal federal responsibility for enforcement rests with the Royal Canadian Mounted Police. Provincial wildlife officers and federal fishery officers also play important roles in enforcement. A vigorous enforcement effort will be continued, to ensure compliance with regulations and to minimize illegal hunting activity. Additional support will be sought through agreements with other agencies. CWS will prepare Annual Migratory Birds Enforcement Plans, with input from all agencies having enforcement capability. The Plans will be discussed and co-ordinated with provincial Wildlife Division biologists and enforcement staff. Enforcement efforts will be focussed on areas where there are special conservation concerns, and where repeated and serious violations of the regulations are known to occur.

The purpose of enforcement is to improve compliance. Solid enforcement is essential, but alone it is not enough. Public information and education must play key roles. Hunter Education Programs will be developed and enhanced to provide a greater focus on natural resource conservation, the importance of safe and ethical hunting practices, and the identification by species of waterfowl.

The survey of the Value of Wildlife to Canadians showed that many people in Newfoundland and Labrador besides hunters participated in wildlife-related activities. Non-hunting activities related to wildlife, such as bird-watching and animal photography, contributed to the economy as well as hunting; Newfoundland and Labrador was the only province in Canada in which hunting contributed more to the economy than did non-consumptive wildlife-related uses. Non-hunters share with hunters an interest in maintaining a numerous and diverse waterfowl resource which is distributed so that access to it is relatively easy. Wildlife areas

will be maintained to protect waterfowl and to provide viewing opportunities. A good example of an area in Newfoundland which could serve this purpose is the Grand Codroy estuary.

Canadian society tends to value wildlife highly as part of our heritage and identity, but, regrettably, it treats wildlife as an unvalued or free good. A healthy wildlife resource has a hard cash value to residents of Newfoundland and Labrador, as well as an intrinsic value. In 1987, wildlife-related activities were estimated to have contributed $64 million to the Newfoundland and Labrador economy. It is essential that the message of the 1987 study of the Value of Wildlife to Canadians becomes commonly understood. Conservation organizations, both public and private, will be encouraged to promote widely information showing the economic values of wildlife. A survey on the value of wildlife to Canadians will be repeated periodically, beginning in 1988.

Although the value of waterfowl to residents of Newfoundland and Labrador is substantial, problems, usually of a local nature, can arise in particular situations. Other provinces have had experiences with introduced Canada Geese as nuisance birds, and with Eiders as depredators of cultured mussels; no such problems with waterfowl are known as yet in Newfoundland and Labrador. Where necessary, governments will contribute to research into methods of controlling nuisance waterfowl and will provide advice to citizens on how problems can be mitigated. The introduction of species which may cause problems to resident species or to people will be discouraged.

Habitat

The objectives for waterfowl habitat are set out in the Newfoundland and Labrador Habitat Protection Plan for Migratory Birds. In September 1987, the Provincial Wildlife Division and the Canadian Wildlife Service ratified the plan, which calls for specific actions to ensure the continued value of important waterfowl habitats. The first major action under the Plan was realized with the listing under the RAMSAR Convention of the Grand Codroy Estuary, in September 1987.

Since the signing of the Migratory Birds Habitat Protection Plan, the North American WMP Committee has sponsored development of the Eastern Habitat Joint Venture (EHJV). This program will provide additional funds for habitat protection and enhancement in eastern Canada, deriving from government and non-government sources in Canada and the United States. Newfoundland will be a partner in this joint venture, which should allow for accelerated implementation of the Migratory Birds Habitat Protection Plan and possibly some additional activities. A program description of the EHJV was prepared in 1989.

In November 1988, the Government of Newfoundland and Labrador and Ducks Unlimited Canada signed a 5-year, $1 million agreement for co-operative programs related to waterfowl conservation in

the province. The Canadian Wildlife Service will also be a partner in this shared venture. This comprehensive agreement, the first of its kind for the province, will implement many of the actions proposed, in the Newfoundland and Labrador Habitat Protection Plan for Migratory Birds and in this document.

Threats and Assessment

Notwithstanding the geological characteristics of most of Newfoundland and Labrador, and the province's geographical position relative to industrial North America, acid rain is not expected to affect waterfowl habitat in the province greatly. Research is being undertaken in the Atlantic Region by CWS, as part of Canadian efforts to assess the importance of acid rain to waterfowl and to monitor its effects over time.

Many important economic development projects may have impacts on waterfowl. The threat to marine birds, including sea ducks. posed by petroleum development offshore is especially important in Newfoundland and Labrador. Water birds are extremely susceptible to the effects of oil spills because exposure to minimal amounts of oil can lead to death. Through environmental impact assessment processes, federal and provincial wildlife agencies will advise on predicted effects of development proposals and suggest mitigative measures.

Direct threats to waterfowl, and other wildlife, can arise from the use and disposal of toxic chemicals. Wildlife agencies provide advice to others regarding the registration, handling and disposal of toxic substances. Research often is necessary to determine the potential impact of a particular chemical. Research will be undertaken, on a priority basis. to provide advice to regulatory agencies and industry on the potential hazards to waterfowl and their habitats, of specific substances, including oil.

Concern is increasing throughout North America over the hazard posed to waterfowl by lead pellets released in wetland habitats through hunting. Waterfowl ingest the pellets, which are abraded in their gizzards and result in lead poisoning. This has long been a recognized problem in areas of concentrated hunting on the wintering grounds. The USFWS has set about eliminating the use of lead shot for waterfowl hunting in the United States by 1991. Recently it has been recognized that ducks may pick up the few pellets, that can give rise to lead poisoning, in low-density hunting areas in Canada, with the symptoms not developing until weeks later when the birds are south of the border. The incidence of lead pellets in gizzards, and of lead concentrations in the blood, will be investigated in various areas in the Atlantic Region, including both hunted and protected sites. Lead shot restrictions may be implemented in areas where there appears to be a potential problem.

Serious outbreaks of contagious diseases, such as avian cholera and botulism, occur occasionally at staging areas where large numbers of

migrating waterfowl concentrate. Avian cholera has recently caused serious mortality at Common Eider colonies in the Gulf of St. Lawrence. Although few instances of such epizootics have been recorded in Atlantic Canada, it is important to detect and respond to outbreaks as soon as they happen, and to be aware of conditions which favour these diseases. Field staff of government wildlife agencies will be trained to detect and report disease outbreaks, through agreements with the Atlantic Veterinary College in Charlottetown, P.E.I., and other veterinary colleges and agencies, which will co-ordinate the response to such incidents.

Conclusion

The Newfoundland and Labrador Waterfowl Management Plan has been prepared in order to chart a course for waterfowl conservation efforts over the next 15 years. It attempts to address all issues of importance to waterfowl in the province. It proposes solutions and specific actions, some of which we know to be controversial. This plan has been approved, and it forms the basis for planning annual activities by CWS-AR, Newfoundland and Labrador Wildlife Division, and co-operating non-government organizations.

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